DOCUMENT RESUME

ED 073 048 SP 005 987

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TITLE Simulation in Inner City Teaching - A Demonstration and Evaluation.
PUB DATE [71]
NOTE 18p.

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS Effective Teaching; *Preservice Education; *Simulation; *Teacher Attitudes; Teacher Behavior; *Teacher Education; *Teacher Education Curriculum; Teacher Response; Teaching Methods

ABSTRACT

This study provided an assessment of the effectiveness of simulation in developing attitudes, values and cognitive understanding in a teacher education program. The experimental participants were 24 undergraduates enrolled in a course on learning and development. The course consisted of demonstrations of problems faced by the teacher in the inner city classroom. The control subjects were enrolled in the nonsimulation section of the same course. The following pretests were administered to the experimental group: Educational Psychology Knowledge Test (EPK); Pupil Control Ideology (PCI); Teaching Confidence Scale (TCS); Perceived Problems Inventory (PPI); and Minnesota Teacher Attitudes Inventory (MTAI). The EPK, PCI, TCS and PPI were administered to the control group. At the end of the course, the tests were readministered to both groups; the Reactions to Simulator Training Inventory (RSTI) was given to the experimental group. An analysis of covariance was used on the pre- and posttest data. Results showed no significant differences between the two groups, however, the reactions of the participants to the simulation program were supportive. A 14-item bibliography was included. (ERB)

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SIMULATION IN INNER CITY TEACHING -

A DEMONSTRATION AND EVALUATION

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ED 073048

Within the past several years there has been considerable interest in "simulation" as an instructional technique. A recently published guide (12) lists over one hundred possible applications for simulation in a wide variety of instructional settings, including teacher education. Unfortunately, the literature includes relatively little systematic research or evaluation of the technique. There is considerable rhetoric about the relevance, excitement, student reactions, cognitive growth, etc., etc., generated by simulation, but with few exceptions (3,5,8,11) users of the technique have not supplied data which support their virtually unanimous enthusiasm.

A comprehensive review of the reported research and a modest trial of the technique previously reported (8) led the writer to plan a more intensive trial of simulation with pre-service teachers. It should be noted that this project was planned as a demonstration-field test rather than as a rigorous experiment. It was felt that using the technique in a real setting, with students actually preparing to teach, under the usual limitations of a typical urban university would provide a potentially useful assessment of the possible contributions of simulation techniques to teacher education programs. It is within this context that the following account should be interpreted.

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Background

Interest in simulation as an instructional technique is relatively new in educational settings but wide-spread use has been reported in other types of instruction. The classic example is the war game which has been with us for centuries. The simulated manipulation of men, equipment, terrain, weather, and the multitude of other factors influencing the conduct of battles and wars has been, paradoxically, a favorite peacetime activity of militarists.

The basic activity of these war games, however, is the essential component of simulation--the manipulation of resources and ideas which are involved in decision making. Cruickshank and Broadbent have offered a useful definition of simulation.

> Simulation may be defined as the creation of realistic models to be operated by participants in order to provide them with problem-solving experiences related to their present or future work. Such game experiences require each participant to make decisions based upon previous training and available information. After decisions are made, the participant is provided with an opportunity to see and/or discuss one or more possible consequences that may result. (5, p.2)

The Link Flight Trainer used in World War II, the sophisticated flight trainers used by modern airlines, business games, simulated space capsules, and medical diagnosis and treatment simulations are other examples of the basic technique. During the last decade, the development of computers has greatly accelerated and facilitated simulation applications. The ability of the computer to code, store, manipulate and evaluate the interaction and impact of literally hundreds of variables has provided designers of simulation techniques with a degree of control and flexibility which greatly enhances the usefulness of the technique.

In the field of teacher education, development has not been as dramatic

but several interesting approaches are noteworthy. Hemphill (9) and his colleagues used an "in-basket" technique to simulate the day-to-day decision-making tasks of the school administrator. Kersh (11) and others, using various media, experimented with a variety of simulated classroom settings in a behavior-shaping laboratory designed to provide feedback relative to decision-making behavior.

Of particular interest in the project reported here is the work of Cruickshank and Broadbent (5) who developed the Teaching Problems Laboratory, a set of materials that creates a fictitious but lifelike elementary school. The simulation participant encounters a series of problems and is expected to analyze the problems and propose solutions. This laboratory provided the basic experience for a revised format, the Inner City Simulation Laborstory (6) used in this study.

At this point, a distinction should be made between "simulations" and "games." Although frequently used interchangeably in the literature, the author believes the two techniques have essential differences which have significance for their potential applications in educational settings. A game may incorporate many of the strategies and elements of simulation, but it goes a step further in adding the element of "winning" and "losing." A game such as Monopoly can be considered as a proto-simulation game since it is based on the manipulation of variables involved in buying and selling real-estate. As in most games, even those utilizing computers, chance is a major factor in winning and losing.

The author maintains that the concepts of winning, losing, and competition should be diminished in the process of developing cognitive skills and facilitating change in attitudes and values. The simulation episode which attempts to help a prospective teacher deal with aggression or stealing,

has little use for the motivation provided by "winning the game." Simulation in teacher education, and in most other professional fields, should not be dependent upon chance to determine winners or losers. Rather, the simulation should require careful and systematic evaluation of all available and relevant data, and consideration of a variety of possible alternative solutions to the problems. In real life teaching, problems are not, or should not be, solved by flipping a coin or rolling dice.

Research Results

In view of the relatively recent development of simulation in teaching, it is not surprising that adequate evaluation of the effectiveness of the technique has been lacking. Enthusiasm is largely based upon observations and feelings of participants rather than on any quantitative data. A few quasi-experiments have been reported but the controls necessary to secure generalizable results were not used, and the learning outcomes were of a low cognitive level (2). Claims of developing skills, processes, attitudes, and values have not been tested in any systematic study. London effectively summarized the situation. "The tests administered to students until now have either ignored or are incapable of gauging certin ramifications of the simulation technique. As long as this remains true, testing accomplished to prove or disprove the effectiveness of simulation as a teaching device will prove nothing at all." (13) Beck and Monroe added, "Research has been hampered by a lack of precision in the statement of objectives of a simulation. In some cases none are stated. Researchers must infer educational benefits from game experience and develop criteria to evaluate the effectiveness of the experience." (1)

Within these broad limitations, several investigators have reported

relevant studies. Cherryholmes (3) used simulation of problems of international relations with high school students. After a simulation experience, participants were asked to respond to several questions indicating whether they enjoyed the experience, whether they found it meaningful, and whether they felt it helped them understand world affairs. To all of these questions, a large majority answered positively. Students' responses on other instruments indicated significant changes in the direction of more realistic attitudes toward the process of decision-making in international relations.

DeKock (7) used the game "Sunshine" with high school students to determine if tolerance for Blacks by Whites could be increased. Significant positive changes on a tolerance-intolerance measure were obtained. Heinkel (10) also reported significant positive attitude changes toward government following use of the game "Napoli." Kersh (11), while not specifically evaluating the effectiveness of simulation, reported that presentation of simulated materials by means of large screen films was more realistic than three other modes utilized. He also concluded that all of the modes of media presentation were effective for learning the indicated teaching behaviors.

Cruickshank and Broadbent (5) attempted to assess changes on such characteristics as perception of teaching problems, teaching confidence, and the range of values and attitudes measured by the Minnesota Teacher Attitude Inventory. In addition, they rated actual teaching performance of simulation participants as compared to non-participants. On all of these measures, simulation was demonstrated to be just as effective as conventional approaches, but not more effective, despite the enthusiastic reactions of the participants to their experience.

With this background of research results, the present study was

designed to provide additional assessment of the effectiveness of simulation in developing attitudes, values and cognitive understandings in a teacher education program.

The Program

The simulation materials used in this study are included in the Inner City Simulation Laboratory (ICSL) distributed by Science Research Associates (6). The Laboratory uses simulation techniques to prepare student teachers or in-service teachers for the realities of inner city classrooms. As participants confront a series of 34 problem episodes, they are expected to apply their conceptual knowledge, attitudes and values in the process of analyzing the problems, proposing possible alternative solutions, and justifying one or more solutions as the most appropriate under the given conditions.

The participant assumes the role of Pat Taylor, a new teacher in the fictitious but realistic "Urban" school system. Pat is assigned to teach the sixth grade in "Edison School" which serves "Gardner Park" in "Urban's" inner city. Following audio-filmstrip orientations to the school, the city and the system, Pat is confronted by a series of 34 incidents which focus on problems of student behavior, parent relations, curriculum planning, methodology and evaluation of learning. Some incidents are presented by role plays, in-basket memos, playlets, and written assignments. Cumulative records for each of the 32 students in the class, a faculty handbook, community statistics and other realistic data are available to the participants in determining the causes and possible solutions to the problems.

A typical incident was used as follows. A 3-4 minute movie was shown which depicts a shy, withdrawn boy who is rejected by most class members.

After participants viewed the film, they examined the cumulative folder of this child and other significant individuals involved in the incident, reports of the school psychologist, notes from parents, and other data. Pat Taylor was then asked to indicate his/her personal reactions to a series of written Response Guidelines such as: What do you think is the problem in this incident? Why is Sydney rejected? What should you do right now for Sydney? What long-range help can you provide?

Following the opportunity for each individual to indicate his tentative reactions, groups of 5-6 persons were formed to discuss their individual and collective reactions to the incident. In these discussions, each Pat Taylor was expected to articulate and defend his analysis and proposed solution of the problem. In this process, previous learning, experience, attitudes, and values were communicated to other group members. The source and validity of the individual's perspectives on teaching and life were continually explored and challenged.

On most occasions, the small group discussions were followed by a total class discussion in which the simulation leader attempted to determine consensus, areas of disagreement, suggestions for further related activities and, at times, would give his preferred "solution" to the problems.

Extra-class assignments included two types of readings. For most incidents a specific periodical article was selected, duplicated and distributed to each participant with instructions to read the article in preparation for the following day's incident. In addition each student was expected to read and report on three books of his choosing on the broad topic of urban education. Selections ranged from Up the Down Staircase (Kaufman) to Black Like Me (Griffin) to Crisis in the Classroom (Silberman).

In an attempt to provide a real classroom experience as a supplement

to the simulated experience, arrangements were made to have participants spend a minimum of one morning per week in a central city school. The restricted schedules of the summer session as well as the demands of participants' class schedules, however, limited the extent to which these observation experiences could be integrated with the simulated experiences. Thus, the complete program of this project included the simulated materials, small and large group discussions, related reading in periodicals and books, and actual observation in an urban school setting.

Participants

All students (N = 24) enrolled in one section of "Introduction to Learning and Development" during an 8-week summer session were the participants in this demonstration project. This course is required for all teacher education students at the University of Wisconsin-Milwaukee; content is similar to the traditional psychological foundations courses in many institutions. In this instance, the usual texts and course outlines were not used; the content consisted of the problems confronted by Pat Taylor; the instructional process focused mainly on problem-solving activities.

Students enrolled in the course were typical of students enrolled in other pre-student teaching courses at the University of Wisconsin-Milwaukee. The 17 females and 7 males were majoring in various teaching education programs (early childhood 5, elementary 8, junior high 2, secondary 5, exceptional 2) and had the usual variety of educational and experiential backgrounds. Most of the students had enrolled in this section in order to fulfill their program requirements, but several indicated that they had enrolled because of their special interest in inner city teaching.

In order to obtain comparative data from a similar group of students,

another section of the same course was used as a comparison group. Several of the instruments described in the following section were administered to these students. The population characteristics of the group were essentially the same as those of the demonstration group, but the teaching procedures were quite different. The comparison group experience was probably typical of most education courses, i.e., lecture, large and small group discussions, assigned texts, periodic examinations, etc.

Data

As indicated by London (13), there is a serious problem in locating and/or devising appropriate instruments for measuring the outcomes of simulation. After several false-start attempts to construct tests which would reliably and validly assess cognitive or attitudinal changes, a decision was made to utilize existing instruments designed to measure the attitudes, values and understandings which are central to the simulated situations used in the ICSL. The following instruments were selected:

1. Educational Psychology Knowledge Test (EPK)

   In an attempt to measure the global cognitive understandings of participants in the broad field of educational psychology, a revised form of a professional teacher education test developed at the University of Wisconsin-Milwaukee was used. Originally constructed to assess the outcomes of several institutional programs, the 54 items most directly related to the field of educational psychology were selected.

2. Pupil Control Ideology (PCI) (14)

   Designed to discriminate attitudes toward pupil control. A 20-item Likert type scale yields results on a custodialism-

humanism continuum.

3. Teaching Confidence Scale (TCS) (5)

   Designed to assess the level of confidence the prospective teacher expresses relative to a series of 32 potential teaching problem areas.

4. Perceived Problems Inventory (PPI)

   Devised by Cruickshank and Broadbent (5) in the process of developing their teaching simulations, the PPI asks the participant to identify what he considers to be critical teaching problems. The 117 items can be categorized into 7 sub-areas such as discipline, evaluation, methods, parent relations, personal, planning, and routines.

5. Minnesota Teacher Attitude Inventory (MTAI) (4)

   Designed to measure those attitudes of a teacher which predict how well he will get along with pupils in interpersonal relationships, and indirectly how well satisfied he will be with teaching as a vocation.

6. Reactions to Simulator Training Inventory (RSTI)

   Adapted from the instrument developed by Cruikshank and Broadbent (5), the RSTI includes 12 Likert type items and 4 open-ended statements designed to elicit the participants' reactions to the simulation experience.

All of the instruments except #6 were administered to the demonstration group as pre-tests during the first several days of the summer session. The Educational Psychology Knowledge Test, The Pupil Control Ideology, the Teaching Confidence Scale, and the Perceived Problems Inventory were administered to the comparison group; it was felt there was extensive data

from other studies available on the MTAI so this instrument was not used with the comparison group. During the last few days of the 8-week session, the same instruments were used with both groups, and the Reactions to Simulator Training Inventory was administered to the demonstration group.

Results

The pre-post test data for the demonstration groups and the comparison group were analyzed using an analysis of covariance with the pre-test as the covariate. Results are summarized in Table 1.

Table 1

Pre-post Test Results for Demonstration and Control Groups

	Demonstration Group N=24 Means		Comparison Group N=38 Means	
	Pre	Post	Pre	Post
Instrument				
Educational Psychology Knowledge	29.83	34.87	26.92	33.18
Teaching Confidence Scale	85.95	91.23	89.82	93.41
Pupil Control Ideology	46.77	47.77	42.05	45.13

Analysis of the data in Table 1 indicates that there were no significant differences in the post-test performance of the two groups when the pre-test scores were used as a covariate; i.e., the changes in cognitive knowledge and attitudes as measured by these instruments were not significantly different for the two groups.

The Perceived Problems Inventory was used as a pre-post instrument only for the demonstration group. Analysis of the total pre-post changes indicated no significant differences. However, an analysis of the 7 sub-scores indicated that participants in the demonstration group apparently became sensitized

to problems in the areas of individualizing instruction, evaluating goals and curriculum, and student behavior. It should be noted that these significant changes were pre-post test differences rather than demonstration-comparison group differences.

The Minnesota Teacher Attitude Inventory was administered to the demonstration group as a pre and post-test. The pre-test mean was 38.17; the post-test mean was 50.13. While the mean gain of 11.96 was statistically significant, and in [illegible]at the test developers call the "positive" direction, it was not as lar[illegible] as has been reported in many other studies using the MTAI.

Participant Reactions

The Reactions to Simulator Training Inventory was used to assess the attitudes and feeling of the participants to the simulated experience. Responses to each of the items are presented below.

1. I enjoyed receiving training in the classroom simulation.

		No.	%
A.	Very much so	24	100
B.	Somewhat	0	0
C.	Not particularly	0	0
D.	Not at all	0	0

2. The classroom simulation was realistic -- "life like."

		No.	%
A.	Very realistic	7	29.2
B.	Realistic	16	66.7
C.	Not particularly realistic	1	4.1
D.	Not realistic at all	0	0

3. I felt as though I was involved in the situation.

		No.	%
A.	Very involved	8	33.3
B.	Involved	14	58.2
C.	Not particularly involved	2	8.4
D.	Not involved at all	0	0

4. The small group discussions were helpful to me.

		No.	%
A.	Strongly agree	18	75
B.	Agree	6	25
C.	Undecided	0	0
D.	Disagree	0	0
E.	Strongly disagree	0	0

5. The large group discussions were helpful to me.

		No.	%
A.	Strongly agree	5	20.9
B.	Agree	17	70.8
C.	Undecided	2	8.4
D.	Disagree	0	0
E.	Strongly disagree	0	0

6. The observations in the city schools were helpful to me.

		No.	%
A.	Strongly agree	4	16.6
B.	Agree	11	45.8
C.	Undecided	6	25.0
D.	Disagree	3	12.5
E.	Strongly disagree	0	0

7. I believe that the simulation experience was meaningful in its relation to real classroom problems.

		No.	%
A.	Very meaningful	17	62.5
B.	Meaningful	9	37.9
C.	Not particularly meaningful	0	0
D.	Not meaningful at all	0	0

8. I feel that this experience in simulation will help me to identify classroom problems.

		No.	%
A.	Very helpful	16	66.7
B.	Helpful	7	29.2
C.	Not particularly	1	4.1
D.	Not helpful at all	0	0

9. I believe that this experience in simulation has helped me develop methods of coping with classroom problems.

		No.	%
A.	Very helpful	10	41.7
B.	Helpful	12	50.0
C.	Not particularly helpful	2	8.4
D.	Not helpful at all	0	0

10. The simulation made the material more meaningful than if it had been presented in "conventional format" (lecture, discussion, text reading, etc.).

		No.	%
A.	Much more meaningful	20	83.3
B.	More meaningful	2	8.4
C.	Less meaningful	0	0
D.	Much less meaningful	2	8.4

11. I would recommend classroom simulation experience to my friends.

		No.	%
A.	Strongly recommend	23	95.8
B.	Recommend	1	4.1
C.	Advise against	0	0
D.	Strongly advise against	0	0

12. I believe the classroom simulation experience was as valuable as the other teacher education courses I have had.

		No.	%
A.	More valuable	20	83.0
B.	Of equal value	4	16.6
C.	Somewhat less valuable	0	0
D.	Not valuable at all	0	0

Discussion

The most meaningful data of this project are represented by the reactions of the participants to the experience; other pre-post and comparison data yielded the classic "no significant difference" results. The simulation group demonstrated comparable gains or changes on all instruments used. Bearing in mind the difficulties in assessing the changes produced by any

instructional process, as well as the lack of precise controls of population selection, it can be concluded that the simulation group did just as well as comparable groups on those knowledges and attitudes which were tested.

The results obtained on the RSTI, however, provide strong support for use of the technique. The overwhelming enthusiasm expressed by the participants (100% enjoyed it very much! 100% would recommend it to their friends!) must be interpreted as a strong endorsement of the technique. The students consistently described the experience as enjoyable, realistic, involving, helpful, meaningful, and valuable. It should be noted that these data were collected anonymously, and after grades had been assigned which reduced the possibility that the participants were expressing these opinions in an attempt to receive a better grade or please the instructor.

Thus, as an individual instructor, and as an institution, we are faced with the perennial dilemma: simulation does not appear to be more affective than conventional approaches in terms of cognitive learning or attitude change -- but the students like it. Should we use it with other students? Is "liking" a course a significant goal in itself? Why wasn't the liking reflected in student achievement and general attitudes toward teaching? Considering the generally apathetic and frequently derisive attitudes expressed by many students toward conventional educational psychology courses, this writer strongly urges further refinement and use of simulation techniques in teacher education programs. In particular, efforts should be made to specify desirable learning outcomes and to apply instructional materials design techniques in order to have greater assurance of the cognitive and attitudinal outcomes of simulation. Follow-up studies of the influence of simulation techniques would also provide relevant data for use in deciding on the extent

to which these techniques are useful in improving professonal education in teaching and other fields.

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